April 14, 2011

Ms. Katharine Kaplan
Team Lead, ENERGY STAR Product Development
US Environmental Protection Agency (6202J)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Ms. Kaplan,

The Northwest Energy Efficiency Alliance (NEEA) applauds the EPA for strengthening the ENERGY STAR specification for computers and is glad to have the opportunity to provide comment on version 6.0 in advance of the final publication. Our comments span across several aspects of the specification, including Graphics Performance per Watt, Discrete Graphics Consumption and Scalability, Idle Power Consumption, Battery Charger Systems, Integrated Displays, TEC Levels, and Network Connectivity in Test Procedure. Comments for this letter were developed in collaboration with California utility Pacific Gas & Electric (PG&E) and National Resource Defense Council, with letters submitted separately by each organization.

Graphics Cards Performance per Watt
NEEA recommends that ENERGY STAR specifications include a graphics performance-per-watt specification. Integrated graphics perform similar to discrete graphics at a fraction of the power consumption. In addition, there are multi-card configurations which proportionally provide less performance than the incremental power delta. ATI and NVidia each manufacture tandem graphics cards which proportionally use much more power than the additional performance provided (ATI CrossFire™, Nvidia SLI™). A 2010 NRDC study found alternative single card configurations available on the market which provide similar performance for significantly lower power.

NEEA recommends the EPA encourage systems to utilize graphics solutions that meet energy efficiency criteria for given performance levels, whether the solution is integrated graphics, a single graphics card or a multi-card configuration. Multi-graphics card configurations should receive no additional allowance, enabling consistent performance per watt measurement against single-card configurations on the basis of energy use.

Discrete Graphics Card Consumption and Scalability
Discrete graphics cards are one of the largest energy-consuming components in desktop PCs, often consuming as much power as the rest of the system. According to a 2010 NRDC study, 80% of that energy consumption occurs in idle or low-graphics mode. Energy efficiency in graphics cards has improved significantly since 2008, but there remains a wide margin for improvement to reduce idle consumption from an average of 25 watts (2010) to 5 watts or less. This efficiency improvement in discrete graphics idle power consumption would save the equivalent output of 3 medium size (500 MW) power plants by 2016[1].

NEEA recommends the EPA set the 2011 energy consumption specification at 25% below the average consumption of cards introduced in 2010, as well as including a test method to specifically measure discrete graphics idle power, refining allowances for computers with only the most efficient discrete graphics to qualify.

[1] Pierre Delforge, Natural Resources Defense Council, Center for Energy Efficiency Standards

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Idle Power Consumption
System level idle power consumption in desktop and laptop PCs has room for energy efficiency improvements, as suggested by the 10-watt idle consumption of the Apple Mac mini™. Many desktop systems consume more than 30 watts idle power. New generation CPUs have total published idle power of 5 watts and 5.5 watts, for dual core and quad core, respectively. These CPUs include graphics processing units, so the idle values include both the power consumed by the graphics as well as the CPU during idle. The remainder of the system energy consumption at idle is greater than 25 watts, with potential for idle state efficiency gains in hard disk drives, memory, and power supplies. NEEA recommends a 10% year over year reduction in idle power consumption.

Power Supplies
The current Energy Star version 5 specification requires internal power supplies (IPS) to meet 80-Plus Bronze (85% efficiency at 50% load). NEEA recommends that ENERGY STAR version 6.0 establishes Internal Power Supply (IPS) requirements to Silver and External Power Supply (EPS) requirements to an average of 89% efficiency. The highest IPS and EPS efficiency on the market today is approximately 95%. This indicates that existing technology allows a 10% efficiency gain above Bronze and 8% above EPS Level V. Voluntary programs have a critical role to play in increasing the adoption of efficient technologies so that economies of scale enable the solutions to become affordable industry-wide. ENERGY STAR specifications which support gradual improvements will enable programs to provide incentives for manufacturers who attain higher efficiency. NEEA recommends efficiency gains of 3% for IPS and 2% for EPS. Nationwide, desktop computers consume approximately 50 billion kWh annually (5700 aMw)—the equivalent of 18 medium-sized power plants.[2] Saving 3% of that energy will make a significant contribution to carbon and air pollution reduction in the US.

External Power Supplies
The Energy Star EPS specification currently requires an average of 87% efficiency for notebook external power supplies. Energy Star 5 for computers requires external power supplies (EPS) to meet the Energy Star EPS requirement. Now that the EPS specification has been discontinued, it is critical to include EPS efficiency requirements directly in the computer spec. NEEA recommends increasing EPS efficiency in ENERGY STAR version 6.0 for computers to an average of 89%. In the March 10 stakeholder meeting, the industry raised a concern about the potential increase in weight, size and heat production of higher efficiency external power supplies. NRDC checked this claim with EPS manufacturers and determined that more efficient EPSs actually dissipate less heat, requiring smaller heat sinks, and therefore enabling smaller size and lighter EPSs

Internal Power Supplies
Industry concerns over the cost of Silver are over-stated. The cost premium of efficiency reduces rapidly as soon as market demand becomes significant. An IPS requirement is important in addition to the Total Energy Consumption (TEC) standard because there are many other ways to reduce energy consumption in desktop computers. Without an IPS requirement, it is likely that IPS efficiency would not be a priority, and that the opportunity to transform the efficiency of the IPS market would be wasted. An ENERGY STAR specification will encourage more rapid adoption in the industry.

Battery Charger Systems
The ENERGY STAR test procedure for notebook computers is limited to energy consumption while connected to AC power, excluding measurement of energy consumption due to battery charging losses during mobile use. According to NRDC analysis, 6% to 10% of notebook typical energy consumption is lost while the battery is charging. The coverage of charging efficiency in the specification is important to track and reward industry partners for creating efficient charging performance. NEEA recommends including efficiency requirements directly in the ENERGY STAR computer specification because it allows levels specific to notebook technology rather than those for generic battery charger systems. A

[2] Pierre Delforge, Natural Resources Defense Council, Center for Energy Efficiency Standards

full representative dataset is not currently available to establish a recommendation for battery charger systems (BCS) efficiency. NEEA recommends that EPA requests representative notebook BCS test data either from manufacturers or from an independent third-party laboratory.

Integrated Displays
The display panels of notebooks and integrated desktops account for approximately 30% of PC energy use and are currently excluded from ENERGY STAR specifications for both computers and displays.[3] Displays are an integral part of the computer and including them in the computer specification would help create incentives for system-level energy efficiency in notebooks and integrated desktops. Industry stakeholders have indicated that some display technologies use more energy than others because of higher image quality. It is unclear which technologies are concerned, the incremental user value provided, or the additional energy required. Too many allowances increase the complexity of the specification as well as potentially reduce its effectiveness by making it too easy to qualify. An overly generous allowance for displays could make it easier to qualify mediocre-efficiency integrated systems. During the March 10 presentation, EPA outlined an approach using a standard allowance based on display size, per the ENERGY STAR Display specification. NEEA supports this approach and cautions against adding allowances for specific display technologies because of the potential increased complexity and reducing the specification's effectiveness by making it too easy to qualify.

Total Energy Consumption (TEC) Levels
Some personal computers which qualify for ENERGY STAR consume as much as four times the energy of the best performers in their category. We recommend considering a combination of creating more stringent levels and revising product categories to ensure that customers can rely on ENERGY STAR to identify the best energy performers in each computer category.

Network Connectivity in Test Procedure
The ENERGY STAR version 5.0 test procedure for desktop PCs, integrated desktop PCs, and notebooks specifies that testing is performed with a live Ethernet connection, if available, and with a wireless connection enabled only if no Ethernet connection is available. Wireless connection has become ubiquitous in today's computers, while most computers also retain an Ethernet connection. User configurations often include both connections active at the same time to enable transparent transition from one to the other when docking and undocking. NEEA recommends updating the test procedure to reflect this and capture the energy consumption from both devices.

Supporting data for recommendations submitted separately by Pierre Delforge of the Natural Resources Defense Council, Center for Energy Efficiency Standards.

Thank you for considering our comments for the computer ENERGY STAR specification version 6.0.

Sincerely,

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[3] EPA Presentation March 10, 2011